

Amendments to the Claims:

This listing of claims will replace all prior versions and listing of claims in the application.

Listing of Claims:

1-46. Canceled.

47. (Previously Presented) A storage system group comprising:

a first storage system coupled to a host device for sending data to and receiving data from said host device, the first storage system including a plurality of disk drives and a disk adaptor used to control the disk drives; and

a second storage system coupled to said first storage system for receiving data from said first storage system,

wherein said first storage system comprises:

a first storage area for writing the data received from said host device, the first storage area being configured by at least one of the disk drives; and

a second storage area for writing the data written in said first storage area and update information relating to said data, the second storage area being configured by at least one of the disk drives;

said second storage system comprises a third storage area for storing the

data read from said second storage area and the update information relating to said data, where the data and update information to be stored in said third storage area are read from said first storage system at given time intervals;

wherein said second storage system defines said time intervals according to a storage capacity of said third storage area.

48. (Previously Presented) A storage system group comprising:

a first storage system coupled to a host device for sending data to and receiving data from said host device, the first storage system including a plurality of disk drives and a disk adaptor used to control the disk drives; and

a second storage system coupled to said first storage system for receiving data from said first storage system,

wherein said first storage system comprises:

a first storage area for writing the data received from said host device, the first storage area being configured by at least one of the disk drives; and

a second storage area for writing the data written in said first storage area and update information relating to said data, the second storage area being configured by at least one of the disk drives;

said second storage system comprises a third storage area for storing the data read from said second storage area and the update information relating to said

data, where the data and update information to be stored in said third storage area are read from said first storage system at given time intervals;

wherein said second storage system reads from said first storage system information relating to a storage capacity of said second storage area in said first storage system and defines said time intervals according to said information,

wherein said second storage area includes a first region for storing the update information and a second region for storing the data, and

wherein said second storage system further includes a fourth storage area to store the data obtained from the third storage area without the update information.

49. (Previously Presented) A storage system group comprising:

a first storage system coupled to a host device for sending data to and receiving data from said host device, the first storage system including a plurality of disk drives and a disk adaptor used to control the disk drives; and

a second storage system coupled to said first storage system for receiving data from said first storage system,

wherein said first storage system comprises:

a first storage area for writing the data received from said host device, the first storage area being configured by at least one of the disk drives; and

a second storage area for writing the data written in said first storage area and update information relating to said data, the second storage area being configured by at least one of the disk drives;

said second storage system comprises a third storage area for storing the data read from said second storage area and the update information relating to said data, where the data and update information to be stored in said third storage area are read from said first storage system at given time intervals;

wherein a plurality of said first storage areas is provided; and the information that is to be written in said second storage area is obtained by taking as an object the data that are to be written in said plurality of first storage areas;

wherein said first storage system allocates said second storage area as a storage area for the update information of the data that is to be written in said plurality of first storage areas and possesses the management information relating to said second storage area; and

said second storage system reads from said first storage system the management information relating to said second storage area possessed by said first storage system, said second storage system defining said time intervals according to said management information.

50. (Previously Presented) A storage system group comprising:

a first storage system coupled to a host device for sending data to and

receiving data from said host device, the first storage system including a plurality of disk drives and a disk adaptor used to control the disk drives;

a second storage system coupled to said first storage system for receiving data from said first storage system; and

a third storage system coupled to said second storage system for receiving data from said second storage system;

wherein said first storage system comprises a first storage area for writing data received from said host device;

said second storage system comprises a second storage area for writing the data written in said first storage area in said first storage system and update information relating to said data;

said third storage system comprises a third storage area for storing the data read from said second storage area in said second storage system and update information relating to said data; and

the data and update information to be stored in said third storage area are read from said second storage system at given time intervals,

wherein said third storage system defines said time intervals according to a storage capacity of said third storage area.

51. (Previously Presented) A storage system group comprising:

a first storage system coupled to a host device for sending data to and

receiving data from said host device, the first storage system including a plurality of disk drives and a disk adaptor used to control the disk drives;

a second storage system coupled to said first storage system for receiving data from said first storage system; and

a third storage system coupled to said second storage system for receiving data from said second storage system;

wherein said first storage system comprises a first storage area for writing data received from said host device;

said second storage system comprises a second storage area for writing the data written in said first storage area in said first storage system and update information relating to said data;

said third storage system comprises a third storage area for storing the data read from said second storage area in said second storage system and update information relating to said data; and

the data and update information to be stored in said third storage area are read from said second storage system at given time intervals,

wherein said third storage system reads from said second storage system the information relating to the storage capacity of said second storage area in said second storage system and defines said time intervals according to said information.

52. (Previously Presented) A storage system group comprising:
- a first storage system coupled to a host device for sending data to and receiving data from said host device;
 - a second storage system coupled to said first storage system for receiving data from said first storage system; and
 - a third storage system coupled to said second storage system for receiving data from said second storage system;
- wherein said first storage system comprises a first storage area for writing data received from said host device;
- said second storage system comprises a second storage area for writing data received from said first storage system and a third storage area for writing the data written into said second storage area and update information relating to said data;
- said third storage system comprises a fourth storage area for storing data read from said third storage area in said second storage system and update information relating to said data; and
- the data and update information to be stored in said fourth storage area are read from said third storage system at given time intervals,
- wherein said third storage system conducts the control so as to determine said time intervals according to a storage capacity of said fourth storage area.

53. (Previously Presented) A storage system group comprising:

a first storage system coupled to a host device for sending data to
and receiving data from said host device;

a second storage system coupled to said first storage system for receiving
data from said first storage system; and

a third storage system coupled to said second storage system for receiving
data from said second storage system;

wherein said first storage system comprises a first storage area for writing
data received from said host device;

said second storage system comprises a second storage area for writing
data received from said first storage system and a third storage area for writing
the data written into said second storage area and update information relating to
said data;

said third storage system comprises a fourth storage area for storing data
read from said third storage area in said second storage system and update
information relating to said data; and

the data and update information to be stored in said fourth storage area
are read from said third storage system at given time intervals,

wherein said third storage system reads from said second storage system
information relating to the storage capacity of said third storage area in said

second storage system and sets said time intervals according to said information.

54. (Previously Presented) A storage system group comprising:

a first storage system coupled to a host device for sending data to and receiving data from said host device;

a second storage system coupled to said first storage system for receiving data from said first storage system; and

a third storage system coupled to said second storage system for receiving data from said second storage system;

wherein said first storage system comprises a first storage area for writing data received from said host device;

said second storage system comprises a second storage area for writing data received from said first storage system and a third storage area for writing the data written into said second storage area and update information relating to said data;

said third storage system comprises a fourth storage area for storing data read from said third storage area in said second storage system and update information relating to said data; and

the data and update information to be stored in said fourth storage area are read from said third storage system at given time intervals,

wherein said third storage system has a fifth storage area corresponding to said second storage area in said second storage system and stores data in said fifth storage area based on the data and update information stored in said fourth storage area.

55. (New) A system for storing data comprising:

a first storage system to be coupled to a host device executing an operation using data stored in the first storage system wherein the first storage system includes a plurality of first disk drives, a first controller coupled to the first disk drives, a first storage area configured in the first disk drives, and a second storage area configured in the first disk drives; and

a second storage system coupled to the first storage system, wherein the second storage system includes a plurality of second disk drives, a second controller coupled to the second disk drives, a third storage area, and a fourth storage area configured in the second disk drives;

wherein the first controller is configured to receive data to the first storage area from the host device, and write the data received from the host device in the first storage area,

wherein if the first storage area is defined as an original storage area, whose data is replicated in the fourth storage area, the first controller is configured to write

the data received from the host device and information relating to a write order of the data in the second storage area,

wherein when a request for transmission of the data and the information relating to the write order of the data is received from the second storage system, the first controller is configured to transmit the data and the information relating to the write order of the data from the second storage area to the second storage system in response to the request from the second storage system, and

wherein the second controller is configured to transmit the request for transmission of the data and the information relating to the write order of the data, write the data and the information relating to the write order of the data, which are received from the first storage system in response to the request, in the third storage area, and write the data received from the first storage system in the fourth storage area according to the information related to the write order of the data, which is stored in the third storage area.

56. (New) A system according to claim 55,

wherein the second storage area includes a first region for storing the information relating to the write order of the data and a second region for storing the data received from the host device.

57. (New) A system according to claim 55,

wherein the second controller is configured to transmit the request for transmission of the data and the information relating to the write order of the data repeatedly, and decide a timing of transmission of the request according to data traffic between the first storage system and the second storage system.

58. (New) A system according to claim 55,

wherein the second controller is configured to transmit the request for transmission of the data and the information relating to the write order of the data repeatedly, and decide a timing of transmission of the request according to a storage capacity of the third storage area.

59. (New) A system according to claim 55,

wherein the second controller is configured to transmit the request for transmission of the data and the information relating to the write order of the data repeatedly, and decide a timing of transmission of the request according to a processing load of the second storage system.

60. (New) A system according to claim 55,

wherein the second controller is configured to transmit the request for transmission of the data and the information relating to the write order of the data repeatedly, and

wherein the second controller is configured to read from the first storage system information relating to a storage capacity of the second storage area in the first storage system, and decide a timing of transmission of the request according to the information relating to the storage capacity of the second storage area.

61. (New) A system according claim 55,

wherein the second controller is configured to transmit the request for transmission of the data and the information relating to the write order of the data repeatedly,

wherein the first storage system is configured to hold management information relating to the second storage area, and

wherein the second controller is configured to read the management information relating to the second storage area from the first storage system, and decide a timing of transmission of the request according to the management information.

62. (New) A system according to claim 55,

wherein a plurality of first storage areas are configured in the first disk drives, and a plurality of fourth storage areas are configured in the second disk drives,

wherein if the plurality of first storage areas are defined as original storage areas corresponding to the plurality of fourth storage areas, the first controller is

configured to write data to be stored in the plurality of first storage areas and information relating to a write order of the data to be stored in the plurality of first storage areas in the second storage area, and

wherein the second controller is configured to write the data received from the first storage system in the plurality of fourth storage areas according to the information related to the write order of the data, which is stored in the third storage area.

63. (New) A system according to claim 55,

wherein the second controller is configured to control the timing of writing data in the fourth storage area according to a processing load of the second storage system.

64. (New) A system according to claim 55,

wherein the first controller includes a host adapter for sending data to and receiving data from the host device, a cache for temporarily storing data received by the host adapter, and a disk adapter for transferring data stored in the cache to the plurality of first disk drives, and

wherein a plurality of logical volumes are configured in the first disk drives, and both the first storage area and the second storage area are selected from the plurality of logical volumes.

65. (New) A system according to claim 55,

wherein the second controller includes a host adapter for receiving data from the first storage system, a cache for temporarily storing data received by the host adapter, and a disk adapter for transferring data stored in the cache to the plurality of second disk drives, and

wherein a plurality of logical volumes are configured in the plurality of second disk drives, and both the third storage area and the fourth storage area are selected from the plurality of logical volumes.

66. (New) A system according to claim 55,

wherein the third storage area in the second storage system is configured in the second disk drives.

67. (New) A system according to claim 55,

wherein the first storage system further comprises a cache memory, and when the first controller receives data to the first storage area from the host device, the first controller is configured to store the data received from the host device in the cache memory, write the data stored in the cache memory in the first storage area, and write the data stored in the cache memory and the information relating to the

write order of the data in the second storage area if the first storage area is defined as the original storage area.

68. (New) A system according to claim 55,
wherein the second storage system is configured to instruct the first storage system to release a part of storage area in the second storage area by transmitting information indicating the part of storage area to be released.

69. (New) A system according to claim 55,
wherein the information indicating the part of storage area to be released is included in the request for transmission of the data and the information relating to the write order of the data, and transmitted from the second storage system to the first storage system.

70. (New) A system according to claim 55, wherein
if the first storage area is defined as the original storage area, whose data is replicated in the fourth storage area, the first controller is configured to transmit a completion report of writing the data to the host device after preparing to write the data and the information relating to the write order of the data in the second storage area, and

if the first storage area is not defined as the original storage area, the first controller is configured to transmit a completion report of writing the data to the host device after preparing to write the data in the first storage area.

71. (New) A system for storing data comprising:

a first storage system coupled to a host device executing an operation using data stored in the first storage system, wherein the first storage system has a plurality of first disk drives, a first controller coupled to the first disk drives, and a first storage area configured in the first disk drives;

a second storage system coupled to the first storage system, wherein the second storage system has a plurality of second disk drives, a second controller coupled to the second disk drives, a second storage area configured in the second disk drives, and a third storage area configured in the second disk drives; and

a third storage system coupled to the second storage system, wherein the third storage system has a plurality of third disk drives, a third controller coupled to the third disk drives, a fourth storage area, and a fifth storage area configured in the third disk drives;

wherein the first controller is configured to write data received from the host device in the first storage area and transmit the data received from the host devices to the second storage system,

wherein the second controller is configured to write data received from the first storage system in the second storage area, and if the second storage area is defined as an original storage area, data stored in which is copied in the fifth storage area of the third storage system, the second controller is configured to write the data received from the first storage system and information regarding to write order of the data in the third storage area,

wherein when a command for requesting transmission of the data and the information regarding to the write order of the data, which are stored in the third storage area, is received from the third storage system, the second controller is configured to transmit the data and the information regarding to the write order of the data from the third storage area to the third storage system in response to the command, and

wherein the third controller is configured to transmit the command for requesting transmission of the data and the information regarding to the write order of the data, which are stored in the third storage area, to the second storage system, write the data and the information regarding to the write order of the data, which are received from the second storage system in response to the command, in the fourth storage area, and write the data stored in the fourth storage area in the fifth storage area by using information regarding to the write order of the data, which is stored in the fourth storage area.

72. (New) A system according to claim 71,

wherein the third controller is configured to transmit the command to the second storage system repeatedly, and the third controller is configured to decide a timing of transmission of the command according to amount of the data and the information regarding to the write order of the data received from the second storage system.

73. (New) A system according to claim 71,

wherein the third controller is configured to transmit the command to the second storage system repeatedly, and decide a timing of transmission of the command according to data traffic between the second storage system and the third storage system.

74. (New) A system according to claim 71,

wherein the third controller is configured to transmit the command to the second storage system repeatedly, and decide a timing of transmission of the command according to a capacity of the fourth storage area.

75. (New) A system according to claim 71,

wherein the third controller is configured to transmit the command to the second storage system repeatedly, and decide a timing of transmission of the command according to processing load of the third storage system.

76. (New) A system according to claim 71,

wherein the third controller is configured to transmit the command to the second storage system repeatedly, read from the second storage system the information relating to a storage capacity of the third storage area in the second storage system, and decide a timing of transmission of the command according to the information relating to the storage capacity of the third storage area.

77. (New) A system according to claim 71,

wherein the third controller is configured to transmit the command to the second storage system repeatedly, read from the second storage system management information relating to amount of the data and the information regarding to the write order of the data, which are stored in the third storage area, and decide a timing of transmission of the command according to the management information read from the second storage system.

78. (New) A system according to claim 71,

wherein the third controller is configured to transmit the command to the second storage system repeatedly.

79. (New) A system according to claim 71,

wherein the third controller is configured to control a timing of writing data stored in the fourth storage area to the fifth storage area according to a processing load of the third storage system.

80. (New) A system according to claim 71,

wherein the fourth storage area in the third storage system is configured in the third disk drives.

81. (New) A system according to claim 71,

wherein the second storage system further comprises a cache memory, and when the second controller receives data from the first storage system, the second controller is configured to store the data received from the first storage system in the cache memory, write the data stored in the cache memory in the second storage area, and write the data stored in the cache memory and the information relating to a write order of the data in the third storage area if the second storage area is defined as the original storage area.

82. (New) A system according to claim 55,

wherein the first storage system includes a plurality of first storage areas, the second storage system includes a plurality of fourth storage areas, and wherein a plurality of copy pairs are defined, each of which includes one of the plurality of first storage areas and one of the plurality of fourth storage areas,

wherein at least one group including at least one copy pair is defined in order to maintain consistency of data in the at least one group in case of stop operations for replicating data of the first storage area in the fourth storage area, and

wherein the first controller and the second controller are configured to hold information relating to the group.

83. (New) A system according to claim 82,

wherein the second controller is configured to transmit the request for transmission of the data and the information relating to the write order of the data according to the information relating to the at least one group.

84. (New) A system according to claim 55,

wherein the second controller is configured to start to transmit the request for transmission of the data and the information relating to the write order of the data, when the second controller receives an instruction to initiate remote copy operations.

85. (New) A system according to claim 84,

wherein the first controller is configured to transmit the instruction to initiate remote copy operations to the second storage system, when the first controller receives an instruction to initiate remote copy operation, the instruction including identification related to the fourth storage area, from the host device.

86. (New) A system according to claim 55,

wherein the second controller is configured to determine whether or not retransmission of the data and the information relating to the write order of the data is needed, and when the retransmission is needed, the second controller is configured to transmit the request for retransmission of the data and the information relating to the write order of the data to the first storage system.

87. (New) A system according to claim 55,

wherein the second controller is configured to write the data received from the first storage system in the fourth storage area according to the information related to the write order of the data, so that the write order of the data in the fourth storage area is maintained after an operation for replicating data of the first storage area in the fourth storage area is stopped.

88. (New) A system according to claim 71,

wherein the third controller is configured to write the data stored in the fourth storage area in the fifth storage area by using the information regarding the write order of the data, so that write order of the data in the fifth storage area is maintained after an operation for copying data of the second storage area in the fifth storage area is stopped.